

FULL SELECTOR TERMINATING SENDERS
TESTS USING TERMINATING SENDER TEST CIRCUIT SD-25159-01
NO. 1 CROSSBAR OFFICES

1. GENERAL

PAGE

1.01 This section describes methods of testing full selector terminating sender circuits in No. 1 crossbar offices using the automatic terminating sender test circuit SD-25159-01.

this reversal is not maintained too long.

5

1.02 This section is reissued to add description of MFS key and BMF lamp used when testing bridged senders. The Equipment Test List is not affected.

D. Trouble Release by Link: This test checks that the sender RL relay operates when the test circuit connects ground to the TR lead to simulate a trouble release signal by a terminating sender link frame.

6

1.03 The tests covered are:

PAGE

A. Regular Call: This test checks the ability of the sender to complete a regular full selector call when the minimum cable loop resistance is used and the fundamental circuit is held open for a minimum time between the registration of each selection. Only the RT leads are used to check that the sender subgroup is idle. Also a check is made that the incoming advance reverse battery closure, by the sender, is not too short.

5

E. Trouble Release by Marker: This test causes the terminating marker connector to make a first and second trial and then connect ground to the TRL lead to operate the sender TRL relay.

6

B. Special Call: This test checks the sender in the same manner as a regular call except that the test frame connects ground to the FC lead to simulate a demand by an incoming trunk for a special marker. This should operate the sender SPL relay and cause the sender to be connected to a special marker instead of a regular marker.

5

F. Premature Trunk Disconnect: This test checks the ability of the sender to restore to normal without connecting to a marker when a premature disconnect by an incoming trunk is encountered.

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C. Telltale (Long Reverse Battery): This test checks the ability of the sender to return reverse battery during brush selection on a telltale call and that

G. Time-Out and Hold: This test checks the ability of the sender to time out, return reverse battery to an originating sender and release within a measured time, or to hold and give an audible and visual alarm, if a 322A plug is inserted in the sender HLD jack, when the time-out occurs.

7

H. L Relay Nonoperate: This test checks the sender in a similar manner as described in Test A except that, after completion of final units selection, a current flow nonoperate test is made of the sender L relay. A check is also made in the incoming advance position

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that the sender will return reverse battery, in not less than 1 to 2.5 seconds, and that the sender will not advance and terminate this reverse battery closure in less than approximately 5 to 12 seconds.

7

I. Test of Sender S Lamp: This test checks that the sender S lamp lights momentarily when the sender is seized.

8

J. SM Relay Hold: This test checks the sender in a similar manner as described in Test A except that the fundamental is held open between selections for a maximum time, instead of a minimum time. This checks that the SM relay is held operated, via contact 5B of the L2 relay, until the L2 relay operates for the registration of the next selection.

8

K. Maximum Cable Loop and L Relay Release: This test checks the sender in a similar manner as described in Test A except that the maximum cable loop resistance and a line leak current flow is simulated by the test frame to check the ability of the sender to register short pulses and the ability of the sender L relay to release under these conditions.

8

L. L Relay Operate and STP Relay Operate and Release: This test checks the sender in a similar manner as described in Test A except that, during final brush and tens selection, a current flow operate test is made. A test of the sender STP relay is also made.

8

M. Test of TT Leads and Premature Advance of Sender Preference Leads: (Where Reserve Sender Test Feature Is Provided.) This test checks the sender in a similar manner as described in Test A except that both the TT and RT leads are used to check that the sender subgroup is idle. A check is also made for a premature advance of the

P leads of the terminating sender link, sender subgroup circuit.

8

N. Test of Delayed Reverse Battery: This test checks the sender in the same manner as described in Test A and, when Fig. P is provided in the test frame, a check is also made, after fundamental circuit is closed for incoming advance, that the closure of reverse battery, by the sender, is not falsely delayed.

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O. Test for False Closure on 1B Register Vertical: This test checks that after the sender L relay has released on a telltale call, the sender RV3 relay is not held operated, due to false closure of contact 3 on any horizontal of the IB register vertical.

9

P. Interdigital Time-Out—Minimum Interval: This test checks the sender in a similar manner as described in Test A except that the registration of final brush selection is delayed for a minimum interval of approximately 2 to 2.5 seconds, to check that the sender does not falsely release within this time.

9

Q. Interdigital Time-Out—Maximum Interval: This test checks the sender in a similar manner as described in Test P, except that a maximum interval of approximately 7 seconds is used to check that the sender does not falsely release.

9

R. DID Operation—OB, OG Selections: This test checks that the sender functions properly on a DID call to a PBX station. On this type of call, the sender records and translates office brush and office group selections into a DID number series indication.

9

S. DID Operation—Dedicated Trunk Group: This test checks that the sender functions properly on a DID call to a PBX station from a panel trunk in a dedicated DID group. On

this type of call, the sender records and translates OA and OB or F00 and F10 indications in combination with an NS1 indication into a DID number series indication. 9

1.04 Arrangements are provided for making a particular test of all terminating senders, or only senders of a particular type, successively, starting either with the first or with any intermediate sender and testing each sender either once or twice. A test can also be repeated indefinitely on one sender.

1.05 When desired, senders which test busy for a predetermined time interval may be passed by automatically.

1.06 Keys are provided for setting up various operating conditions in order that any possible service call condition may be simulated and the resulting operations checked. The functions of these keys, as well as functions of locating, progress, and trouble lamps are described in Part 5.

1.07 The test circuit makes use of regular service circuits in addition to the sender under test. These include the terminating marker connector, terminating marker, and the sender selector.

1.08 In testing a full selector terminating sender for regular call operation, the sender is first tested for busy and, if idle, the test circuit transmits frame indication and, on senders arranged to serve calls to multioffice terminating units, the office indication. The test circuit then completes the fundamental circuit to the sender for incoming brush selection. The sender sends revertive pulses until the test circuit opens the fundamental circuit indicating that it is satisfied for incoming brush selection, in accordance with the setting of the TH key. The sender, meanwhile, has registered on its selections register switch, the incoming brush selection corresponding to the number of revertive pulses sent. Incoming group, final brush, tens and units selections are made in a manner similar to incoming brush. After selections are completed and the fundamental has been opened for the proper interval, the test circuit recloses the fundamental for incoming advance (reverse battery). When the sender has completed incoming advance, it seizes a terminating marker and passes to the

marker the information it has registered. At this time, the test circuit records the information which is passed by the sender to the marker and checks that the information corresponds to the selections imposed on the sender by the test circuit. If any digit does not check with that setup on the keys, the test circuit blocks with the corresponding lamp lighted. Frame registration is checked in a similar manner.

1.09 When the first sender of the first subgroup has been tested, the test circuit will advance to the next sender and will continue this process until all senders of the subgroup have been tested, a test failure occurs, or a busy sender is encountered.

1.10 If no test failures occur, the test circuit will advance automatically to succeeding subgroups of senders, if any. Arrangements may also be provided, either to stop the test frame and display a lamp if the succeeding subgroup contains senders requiring a different test frame setting, or to pass by certain intermediate subgroups that contain senders requiring a different test frame setting than those of the preceding and succeeding subgroups.

1.11 When the last sender to which the test circuit has access is tested, the EC lamp will light and a minor alarm will be sounded.

1.12 If the sender fails to perform any of its functions, the test circuit blocks and, except in making time-out tests, causes an alarm to be sounded. Lamps are provided to indicate which sender is being tested and progress lamps are provided to indicate what function of the sender is being tested at any particular time (see Part 5).

1.13 The test circuit should not be left running with the TA key operated because a test failure would hold either one sender or a complete subgroup of senders out of service without an alarm.

1.14 Registers are provided as follows: Circuits tested (CT) to record the number of circuits tested successfully, repeat single test (RST) to record the number of successful repeat tests and pass busy (PB) to record the number of busy senders passed by without testing.

1.15 Local instructions should be followed with reference to recording any register operations caused by performing these tests.

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1.16 Lettered Steps: The letter a, b, c, etc, added to a step number in Part 3 or 4 of this section, indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2.02 32A test set (as required).

Tests F and G

2.03 322A (make-busy) plugs, as required.

Test G

2.04 KS-3008 stopwatch or equivalent.

2. APPARATUS

All Tests

2.01 Terminating sender test frame SD-25159-01.

3. PREPARATION

STEP	ACTION	VERIFICATION
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All Tests

1	Restore all lever-type keys to normal.	
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2	Operate RN key.	All lamps extinguished.
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3a	If test frame does not restore— Momentarily operate CA key.	All lamps extinguished.
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4	Restore RN key.	
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5b	If end-of-group feature is provided, and is required— Operate proper EG- key.	
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Note: The operation of an EG key will cause the test circuit to block with the EG lamp lighted when all senders having certain operating conditions have been tested. Upon receiving the EG lamp during test, consult the office records and reset the test frame keys as required. Restore the EG- key to allow the test frame to advance.

6c	If the pass-group feature is provided and it is desired to pass senders having different operating conditions than those for which the test frame is set up— Operate PG- key or keys.	
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7d	If only full selector senders are to be tested— Operate the TS key.	
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4. METHOD

STEP	ACTION	VERIFICATION
A. Regular Call		
8	Operate keys as shown on test chart.	
9	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lighted. Minor alarm sounded.
10	Restore ST key.	
11	Momentarily operate RN key.	All lamps extinguished. Minor alarm silenced.
B. Special Call		
8	Operate keys as shown on test chart.	
9	Make busy both special markers.	
	<i>Note:</i> Making both special markers busy prevents all special calls from completing.	
10	Operate ST key.	Test circuit blocks with TC lamp lighted.
11	Release one special marker.	Test circuit advances. TC lamp extinguished.
12	Make busy both special markers again.	
13	Repeat Steps 10 and 11 for other senders to be tested.	EC lamp lighted. Minor alarm sounded.
14	Restore ST key.	
15	Momentarily operate RN key.	All lamps extinguished. Minor alarm silenced.
C. Telltale (Long Reverse Battery)		
8	Operate keys as shown on test chart.	
9	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lighted. Minor alarm sounded.
10	Restore ST key.	

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STEP	ACTION	VERIFICATION
11	Momentarily operate RN key.	All lamps extinguished. Minor alarm silenced.
D. Trouble Release by Link		
E. Trouble Release by Marker		
<i>Note:</i> Test D holds the sender subgroup busy almost continually; Test E holds a marker busy until it times out in 1.15 to 2.45 seconds, twice on each test call. These tests should therefore be made during periods of light traffic.		
8	Operate keys as shown on test chart.	
9	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lighted. Minor alarm sounded.
10	Restore ST key.	
11	Momentarily operate RN key.	All lamps extinguished. Minor alarm silenced.
F. Premature Trunk Disconnect		
<i>Note:</i> In order to prevent the sender under test from being seized by a service call, during an unguarded interval while this test is in progress, the sender subgroup is held busy by the test frame, continually. For this reason, this test should preferably be made during periods of light traffic and under close supervision.		
8	Operate keys as shown on test chart.	
9	At the TTI frame— Insert a 322A plug into the hold jack of the sender to be tested.	
10	Operate ST key.	Test frame proceeds to test sender.
11	As test frame advances off sender, remove 322A plug from hold jack of first sender and insert it into hold jack of next sender to be tested.	
12	Repeat Step 10 for other senders to be tested.	EC lamp lighted. Minor alarm sounded.

STEP	ACTION	VERIFICATION
13	Restore ST key.	
14	Momentarily operate RN key.	Test circuit restored. All lamps extinguished. Minor alarm silenced.
G. Time-Out and Hold		
8	Operate keys as shown on test chart.	
9	At TTI frame— Insert a 322A plug into the hold jack of the first sender to be tested.	
10	Operate ST key.	Test frame proceeds to test first sender. RB lamp lighted.
11	Using a stopwatch— Measure the time that RB lamp remains lighted.	RB lamp remains lighted 29 to 58 seconds. One second after RB lamp is extinguished— Test frame blocked. TC and S lamps lighted. At TTI frame— TL lamp lighted. In 5 to 12 seconds after TL lamp lighted— Minor alarm sounded.
12	Momentarily operate AV key.	Test frame advanced to next sender. TC and S lamps extinguished.
13	Remove 322A plug from hold jack of the first sender and insert it into hold jack of the next sender to be tested.	TL lamp extinguished. Minor alarm silenced.
14	Repeat Steps 10 through 12 for other senders to be tested.	EC lamp lighted. Minor alarm sounded.
15	Restore ST key.	
16	Momentarily operate RN key.	Test circuit restored. All lamps extinguished. Minor alarm silenced.
H. L Relay Nonoperate		
8	Operate keys as shown on test chart.	
9	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lighted. Minor alarm sounded.
10	Restore ST key.	

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STEP	ACTION	VERIFICATION
11	Momentarily operate RN key.	All lamps extinguished. Minor alarms silenced.
I. Test of Sender S lamp		
8	Operate keys as shown on test chart.	
9	At TTI frame— Operate BAT key. (On earlier installations, operate L key at TSL frame.)	
9	Operate ST key.	Test circuit proceeds to test all senders to which it has access. As each sender is seized— S lamp momentarily lighted. EC lamp lighted. Minor alarm sounded.
11	Restore ST key.	
12	Momentarily operate RN key.	All lamps extinguished. Minor alarm silenced.
J. SM Relay Hold		
K. Maximum Cable Loop and L Relay Release		
L. L Relay Operate and STP Relay Operate and Release		
8	Operate keys as shown on test chart.	
9	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lighted. Minor alarm sounded.
10	Restore ST key.	
11	Momentarily operate RN key.	All lamps extinguished. Minor alarm silenced.
M. Test of TT Leads and Premature Advance of Sender Preference Leads		
	Note: This test should be made during periods of light traffic, since before the test frame can connect to a particular sender, it is necessary for two or more senders in the associated subgroup to be idle.	

STEP	ACTION	VERIFICATION
8	Operate keys as shown on test chart.	
9	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lighted. Minor alarm sounded.
10	Restore ST key.	
11	Momentarily operate RN key.	All lamps extinguished. Minor alarm silenced.

Tests N, O, P, Q, R, and S

Note: Test O is necessary only when Fig. D is provided in the sender.

8	Operate keys as shown on test chart.	
9	Operate ST key.	Test circuit proceeds to test senders to which it has access. EC lamp lighted. Minor alarm sounded.
10	Restore ST key.	
11	Momentarily operate RN key.	All lamps extinguished. Minor alarm silenced.

5. INTERPRETATION OF JACK, KEY, AND LAMP DESIGNATIONS

5.01 JACKS

JACK	PURPOSE	KEY	PURPOSE
		ACO	Alarm Cutoff: To prevent or silence the audible alarm.
		APB	Automatic Pass Busy: To automatically pass by senders if they remain busy for 29 seconds minimum to 59 seconds maximum.
RC	Remote Control: The jacks are located on the sender frames. Momentary insertion of a make-busy plug causes the CA feature to operate. Used in conjunction with a 32A test set, depression of the red button operates the CA feature; depression of the white button controls the DSS or SS advance, depending on which key at the test frame is operated.	AV	Advance: To manually advance the test circuit on a step-by-step basis, when the SS key is operated, or to advance the test frame to the next sender during time-out tests.
		CA	Control Advance: To manually advance the test circuit to the next sender or to restart a repeat test of the same sender, depending upon the position of the REP key. (See RC Jack.)

5.02 KEYS

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CL (0-7) **Class:** To provide for setting up the following classes of test:

0 REG **Regular:** To simulate a regular call, as from an originating sender.

1 SPL **Special:** To simulate a special call, as from an incoming trunk requiring a special marker.

2 TT **Telltale:** To simulate a telltale condition during incoming brush selection.

3 TRL **Trouble Release Link:** To simulate a trouble release by a terminating sender link controller circuit.

4 TRM **Trouble Release Marker:** To prevent the marker from giving a regular release signal to the sender, thereby causing a second trial to be made and then a trouble release.

5 TD **Trunk Disconnect:** To simulate a premature disconnect by an incoming trunk.

6 TO **Time-Out:** To make the sender time out by preventing selections from being made.

7 LNO **L Nonoperate:** To provide a nonoperate test of the sender L relay.

DD **Dedicated DID Trunk Group:** To simulate a call from a dedicated DID trunk group.

EG (1-4) **End of Group:** To stop the test circuit after it has tested the last sender in a group for which the test circuit was prepared. (See Part 3, Step 5b.)

F (0-9) **Frame:** Operate the key (0-9) that corresponds to the units digit of the desired incoming frame indication which is to be transmitted to the sender.

FA (0-2) **Frame Auxiliary:** Operate one key (0-2), when provided, to supplement the F key.

FA-0 (a) Operate when testing senders arranged to serve more than ten incoming frames and it is desired to transmit to the sender an incoming frame number of nine or below.

(b) Operate when testing senders arranged to serve ten or less incoming frames and the associated markers and terminating sender test frame are both arranged to work with senders arranged to serve more than ten incoming frames.

(c) Operate to indicate to the sender, that office unit A is desired where there are more than ten incoming trunk frames and the "F00" and "F10" leads from the link and the "F10" lead to the marker are used for indicating the desired office unit.

FA-1 (a) Operate when testing senders arranged to serve more than ten incoming frames and it is desired to transmit to the sender an incoming frame number of ten or above.

(b) Operate to indicate to the sender, that office unit B is desired where there are more than ten incoming trunk frames and the "F10" leads to the marker are used for indicating the desired office unit.

FA-2 (a) Operate when testing senders not equipped with "F00" and "F10" relays and where the associated markers are not equipped with "F10" relays, but the terminating sender test frame is arranged to work with other senders and markers which are arranged to serve more than 10 incoming frames.

G (0-1)	Group: To provide for the selection of the associated sender connector switch, when the test frame has access to more than ten sender subgroups.		(P) preference leads of that circuit. With this key normal, only the (RT) reserve test leads are checked.
H (0-9)	Hundreds: To set up the hundreds digit of a called number.	LOA	Local Office A: To set up the office indication A to be transmitted to the sender.
IDT	Interdigital Time-Out: To delay the registrations for final brush selection to check the minimum interval of the time-out feature.	LOB	Local Office B: To set up the office indication B to be transmitted to the sender.
IDT1	Interdigital Time-Out: To delay the registrations for final brush selection to check the maximum interval of the time-out feature.	LOC	Note: Operate the OAB key when LOB key is operated.
IG5	Incoming Group "High 5": To provide for transmitting five additional pulses to the sender during incoming group selection.	MFS	Local Office C: To set up the office indication C to be transmitted to the sender.
L	Loop: To change the simulated cable loop resistance from 700 ohms to 2950 ohms to test the revertive pulsing feature of the sender and the ability of the sender L relay to release, when a line leak current flow exists.	MGB	♦Multifrequency Sender: Tests only MF senders when operated.♦
LRB	Long Reverse Battery: To check that the sender, in incoming advance, does not maintain reverse battery too long. With this key normal, a check is made that the closure is not too short.	NS (0-9)	Make Group Busy: To make busy the sender subgroup to which the test frame is connected, thereby giving preference to the test frame for this subgroup of senders.
LST	Long Selection Time: To check that the sender functions properly when the maximum time is allowed between selections. With this key normal, a minimum time is allowed between selections.	OAB	Number Series: To check the number series leads grounded to the marker by the sender on a DID call.
LT	Light Traffic: To check, during periods of light traffic, the TT (regular test) leads of the terminating sender link sender subgroup circuit. Also, to check for a premature advance of the	OI (0-9)	Office A or B: To check that the sender gives the proper office unit indication to the marker when an office unit B indication has been transmitted to the sender.
		PBS	Office Indication: To cause office brush selection, corresponding to the key depressed, to be made in the sender on a DID call.
		PCR	Pass B Senders: To test only full selector senders.
			Particular Circuit Run: To cause the test circuit sender connector equipment to advance automatically until the PCR key is restored to normal.

PCS	Particular Circuit Step: To cause the connector switch to advance one step at a time to a particular sender.	U (0-9)	Units: To set up the units digit of the called number.
5.03 LAMPS			
PG (1-4)	Pass Group: To cause the test circuit to pass a group of senders requiring a different test circuit preparation.	LAMP	INDICATION
		BMF	◆ Bridged MF: Indicates that MF portion of a bridged sender is being tested.◆
RBT	Reverse Battery Test: To check that after final units selection, reverse battery closure is not delayed.	BY	Busy: Indicates that the sender, to which the test circuit is connected, is busy.
REP	Repeat: To test the same sender repeatedly.	CH	Chain: Indicates the operation of the S- relay failed to remove ground from the TCH lead.
REP2	Repeat 2: To make two tests on a sender before advancing.	CH1	Chain 1: Indicates that the operation of the S- relay failed to remove battery from the TCH1 lead.
RN	Return to Normal: To restore the test circuit to normal.		
SS	Step-by-Step: To transmit revertive pulses for each selection on a step-by-step basis under the control of the AV key. (See RC jack.)	CO	CO Lead: Indicates that the test circuit is awaiting ground on the S and CO leads from the sender.
ST	Start: To start the test circuit.	D	D Lead: Indicates that the test circuit is waiting for the sender to (1) remove battery from the CO lead (2) connect battery to the T and R leads (3) connect ground to the D lead or, during Test J, remove ground from the S lead.
STP	Stepper: To make an operate, and with WG option, a release test of the STP relay.		
T (0-9)	Tens: To set up the tens digit of the called number.	DG	D Lead Ground: Indicates that the D lead was grounded prematurely or, during Test J, that the sender failed to remove ground from the D lead.
TA	Time Alarm: To prevent or silence the test circuit alarms.		
TH (0-9)	Thousands: To set up the thousands digit of the called number.	EC	End of Cycle: Indicates that the last sender to which the test frame has access has been tested satisfactorily.
TS	Terminating Senders: To test only full selector senders.		
TT-SC	Telltale Short Circuit: To check for a false closure on the IB register vertical on a telltale call.	Progress Lamps	
		EF	Even Frame: Indicates the EF relay has failed to operate

	on a call using an even-numbered frame indication.	MGB	Make Group Busy: Indicates the sender subgroup is being held busy by the test circuit. If the lamp remains lighted for an interval longer than 5 to 12 seconds, the major alarm will sound.
EG (1-4)	End of Group: Indicates, when provided, that the last sender of a sender subgroup associated with the operated EG- key, has been tested satisfactorily.		
F	Frame: Frame registration failed to check with associated F key.	NS	Number Series: Number series check is being made on a DID call. This check is made of the grounded NS leads to the marker against the associated NS key.
F10	Frame Above 10: Frame registration failed to check with associated F10 key.	OAB	Office A or B: Office registration failed to check with associated OAB key.
FB	Final Brush: Final brush selection is being checked.	OBI	Office Brush: Office brush selection is being checked on a DID call.
FT	Final Tens: Final tens selection being checked.	OG	Office Group: Office group selection is being checked on a DID call.
FU	Final Units: Final units selection is being checked.	RB	Reverse Battery: Indicates that the test circuit is waiting for the reverse battery closure for incoming advance. The RB lamp remaining lighted may indicate that the reverse battery was either not maintained long enough, maintained too long, or was falsely delayed, depending on the particular test being made.
G (0-1)	Group: Indicates the particular sender test connector switch in use when more than one sender test connector switch is provided.	REV- PLS CHK (0-9)	Revertive Pulse Check: Indicates the particular number of the register check relays that were operated in the test frame by the marker. Compare these lamps with the setting of the keys for the particular digit on which the failure occurred, as indicated by the lighted register check lamps.
GB	Group Busy: Indicates the group busy test is being made.		
H	Hundreds: Hundreds registration failed to check with associated H key.		
HOR (0-9)	Horizontal: Indicates the horizontal row (sender subgroup) of the connector switch to which the test circuit is connected.		
IB	Incoming Brush: Incoming brush selection is being checked.		
IDT	Interdigital Time-out: Indicates that the interdigital time-out feature of the sender is being checked.	RL	RL Lead: Indicates that the test circuit is waiting for the sender to connect ground to the RL lead.
IG	Incoming Group: Incoming group selection is being checked.		

- S** **S Lead:** Indicates that the test circuit is waiting for the sender to connect ground to the S lead. Also lights during Test J when ground is removed from the S lead.
- SEL** **Selection:** Indicates that the test circuit is waiting for the S-relay to operate and connect ground to the S- lead.
- SPF** **Sender Preference:** Indicates that the test circuit is waiting for the operation of the SB- relay to advance the P lead to the next sender in the subgroup chain.
- T** **Tens:** Tens registration failed to check with associated T key.
- TA** **Time Alarm:** Indicates that the test was not completed within the allowable interval.
- TC** **Trunk Closure:** Indicates that the test circuit is waiting for the sender to be connected to a marker.
- TH** **Thousands:** Thousands registration failed to check with associated TH key.
- TRL** **Trouble Release:** Lights during Test I after the first marker times out, and remains lighted until the second marker times out and gives a trouble release.
- U** **Units:** Units registration failed to check with associated U key.
- VERT (0-9)** **Vertical:** Indicates the vertical (particular sender) of the connector switch to which the test circuit is connected.
- X** **Cross:** Indicates that either false battery or ground was detected on one of the leads checked by the X-relays of the test frame or, during Test E, the sender preference lead was advanced prematurely.

6. PREPARATION OF TEST CHART

6.01 Complete the test chart to show the test frame keys to be operated for each test as directed in Table A and the following paragraphs.

6.02 Operate one key (0-2), when provided, in the FA group. The functions of the FA keys are described in paragraph 5.02.

6.03 Tests 1 through 8 and 11 through 15 check the ability of a particular select bar, its unengaged select fingers, and its off normal contacts to restore to normal and become stabilized before a following selection is registered.

6.04 Tests 16 through 25 check the ability of a particular select bar to operate in one direction when the maximum number of select fingers possible are trapped in the opposite direction.

6.05 Tests 26 through 35 check the ability of a particular select bar and its unengaged select fingers to release and become stabilized in the minimum time between selections when the maximum number of select fingers are trapped in one direction.

6.06 Tests 9 and 10 check sender features as shown on Table B.

TABLE A

TRUNK ARRANGEMENT	OPERATE KEY	TO INDICATE OFFICE
Individual Trunks Only	LOA	A
	LOB OAB	B
Common Trunks Only	None	A
	OAB	B
Simulating Individual (Both Common and Individual Trunks)	LOA	A
	LOB OAB	B
Simulating Common (Both Common and Individual Trunks)	LOC	A
	LOC OAB	B

Note: In some multioffice terminating units where there are not more than 10 incoming trunk frames, the FA-0 and FA-1 keys are used to indicate office A and office B.

TABLE B

NUMBER	SENDER FEATURES TESTED
0000	L2 relay held until SM relay releases. SM relay held, via back contact of HM relay, after L2 relay operates for next selection. 6B and 8B contacts of L2 relay for closure and slow operate time of L2 relay. Operate and release time of RA1 relay.
9999	P1 to P6 relays for speed. Response of L3, L4, and L5 relays to opening of GR relay contacts. 3B contact of L2 relay for closure. 6B contact of L2 relay does not open too soon, due to fast release.

TEST CHART

FULL SELECTOR SENDER TESTS

BSP TEST	TEST NO.	TITLE	TH	H	T	U	F	FA	TEST CLASS	LOA	LOB	LOC	OAB	MISC.
A	1	FULL SELECTOR CALL	4	2	0	2	0		0					
	2		1	0	2	0	2		0					
	3		4	7	1	2	1		0					
	4		3	1	2	1	2		0					
	5		6	3	0	3	0		0					
	6		1	5	3	0	3		0					
	7		8	4	0	4	0		0					
	8		1	8	4	0	4		0					
	9		0	0	0	0	5		0					
	10		9	9	9	9	6		0					
	11		0	0	5	0	5		0					IG5
	12		0	5	6	0	6		0					IG5
	13		1	0	7	0	7		0					IG5
	14		1	5	8	0	8		0					IG5
	15		0	9	9	0	9		0					
	16		0	0	0	1	0		0					
	17		2	6	1	0	1		0					
	18		5	2	2	3	2		0					
	19		7	8	3	2	3		0					
	20		8	4	4	5	4		0					
	21		0	0	5	4	5		0					IG5
	22		2	6	6	7	6		0					IG5
	23		5	2	7	6	7		0					IG5
	24		7	8	8	9	8		0					IG5
	25		9	4	9	8	9		0					
	26		0	0	0	2	0		0					
	27		2	6	1	2	1		0					
	28		5	2	2	0	2		0					
	29		7	8	3	0	3		0					
	30		8	9	4	0	4		0					
	31		0	0	5	0	5		0					
	32		0	5	6	0	6		0					
	33		1	0	7	0	7		0					
	34		1	5	8	0	8		0					
B	35	SPECIAL CALL	0	0	9	0	9		1					

TEST CHART
SENDER TESTS

BSP TEST	TEST NO.	TITLE	TH	H	T	U	F	FA	TEST CLASS	LOA	LOB	LOC	OAB	MISC.
C	36	TELLTALE TEST (LONG REVERSE BATTERY)	0	0	0	0	0		2					LRB
D	37	TROUBLE RELEASE BY LINK	2	6	1	1	1		3					
E	38	TROUBLE RELEASE BY MARKER	0	0	0	0	0		4					
F	39	PREMATURE TRUNK DISCONNECT	0	0	0	0	0		5					REP-2
G	40	TIMEOUT AND HOLD	4	2	2	2	2		6					LRB, TA
H	41	L RELAY NONOPERATE	6	8	3	3	3		7					
I	42	TEST OF SENDER S LAMP	0	0	0	0	0		0					BAT KEY AT TTI
J	43	SM RELAY HOLD	8	4	4	4	4		0					LST
K	44	MAX CABLE LOOP AND L RELEASE	9	9	9	9	5		0					L (Note 1)
L	45	L AND STP RELAY OPERATE	0	4	9	0	6		0					STP-OPR
M	46	TEST OF TT LEADS AND PREMA- TURE ADVANCE OF SENDER PREF- ERENCE LEADS	7	7	7	7	7		0					LT
N	47	DELAYED REVERSE BATTERY	8	8	8	8	8		0					RBT
O	48	FALSE CLOSURE — IB VERTICAL	6	6	6	6	9		2					TT-SC
P	49	INTERDIGITAL TIMEOUT — MIN.	5	5	5	5	5		0					IDT
Q	50	INTERDIGITAL TIMEOUT — MAX.	4	4	4	4	4		0					IDT-1
R	51	DID CALL — OB, OG SELECTIONS	3	3	3	3	3		0					OI (0-9), NS (0-9) (Note 2)
S	52	DID CALL — DEDICATED TRUNK GROUP	2	2	2	2	2		0					DD, NS (0-9), (Note 3)

Note 1: Also BAL key if testing balanced revertive pulse circuits.

Note 2: NS-key must match OI-key according to local cross-connection information.

Note 3: NS-key must match LOA, LOB, or F, FA keys according to local cross-connection information.